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Biodiversity in and around McElligot's Pool

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SANDRA B. ZELLMER* AND SCOTT A. JOHNSON**

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"Young man," laughed the farmer, "You're sort of a fool!
You'll never catch fish in McElligot's Pool!"

"The pool is too small. And, you might as well know it,
When people have junk here's the place that they throw it.
You might catch a boot or you might catch a can.
You might catch a bottle, but listen young man. . .
If you sat fifty years with your worms and your wishes,
You'd grow a long beard long before you'd catch fishes!"[1]

I. INTRODUCTION

Perched on the grassy banks of farmer McElligot's pool, the boy, Marco, an eternal optimist, speculated that the tiny pond of water was

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1. DR. SUESS, MCELLIGOT'S POOL 1 (Random House 1947).

connected to a vast underground aquifer, a mighty river or even an ocean. He dreamed of catching all sorts of fantastic species from exotic places like the tropics, the Arctic and the Far East, providing hours of entertainment to young audiences full of wonder about the "places [they] will go."[2] But Farmer McElligot's assessment of the state of his pool—a biological wasteland—conveys the more forceful environmental message.[3] Judging from the condition of most farm ponds and creeks back in those days, boots, bedsprings, and auto parts were a fisherman's most likely catch. If you did happen to hook a fish, it probably would not have been fit for consumption due to polluted runoff from farm fields channeling a sinister brew of agricultural chemicals into the water.

Through characters like farmer McElligot and the Lorax, who spoke out against the greedy Once-ler and his destructive clearcutting practices,[4] Theodor Geisel, a.k.a. Dr. Suess, vividly depicted the plight of many private lands and waterways in the twentieth century. Although the message still resonates with children (and adults) today, the ecological health of private land has not improved a whole lot since Geisel wrote *McElligot's Pool* in 1947. Don't get me wrong, there have been immense gains in industrial pollution control and in habitat preservation on public lands. Yet there is still a long way to go, particularly on private lands. And it is not just the ponds, streams, and wetlands that are suffering. The destruction of wooded areas, loss and contamination of topsoil, depletion and pollution of surface and ground water, and air pollutants have all contributed to the poor health of rural America. The pressure to boost yields with modern chemicals and to plant to the edge of the water in the face of ever-declining crop prices is at least as compelling today as it was then. Perhaps the largest factor in the demise of biodiversity nation-wide, though, is the loss of open space to sprawling suburban subdivisions. Residential and commercial development is rapidly devouring much of the best farmland in the country, blanketing it with a sea of pavement, while a steady stream of farmers pack in generations of small-scale, diverse and generally sustainable family farms.

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2. DR. SUESS, OH THE PLACES YOU'LL GO (Random House 1990).

3. Ironically, the subject of Marco's desire—non-indigenous, invasive species—is second only to habitat loss in its contribution to the demise of biodiversity worldwide. *See* John J. Ewel et al., *Deliberate Introductions of Species: Research Needs*, 49 BIOSCIENCE 619, 620 (1999); David S. Wilcove et al., *Quantifying Threats to Imperiled Species in the United States*, 48 BIOSCIENCE 607 (1998). For further discussion of aquatic invaders, see Sandra B. Zellmer, *The Virtues of "Command and Control" Regulation: Barring Exotic Species from Aquatic Ecosystems*, 2000 U. ILL. L. REV. 1233 (2000).

4. *See* DR. SUESS, THE LORAX (Random House 1971) (describing the Lorax's efforts to protect a Trufella forest and its inhabitants from the Once-ler and his Super Ax Hacker); SUESS, *supra* note 1, at 1.

The demise of ecosystem, species and genetic diversity caused by the destruction of natural habitats is a contemporary crisis of immense importance.[5] With the loss of our farms comes the loss of some of the last remnants of privately owned open space in the country. The National Wildlife Federation recently issued this alarming assessment:

> Due primarily to agricultural conversion and urbanization, prairie grasslands such as those found across the Great Plains are now considered North America's most endangered ecosystem. Ninety-nine percent of the nation's tallgrass prairies and up to seventy percent of the mixed and shortgrass prairies in some states have disappeared from the American landscape.[6]

Consider the midwestern Plains states: North Dakota, South Dakota, Nebraska, Kansas and Iowa. There is precious little public land within these states. Iowa takes the dubious prize, with federal public land comprising less than one percent of the land within its borders.[7] Is it a coincidence that the prairie is nearly decimated, along with its native inhabitants? Doubtful.

While much has been written on the subject of biodiversity on public lands, and judicial opinions on the plight of the northern spotted owl and old growth ecosystems fill volumes of federal reporters,[8] far less attention has been paid to protecting biodiversity on private lands. This is attributable, at least in part, to the consciousness-raising force of the National Environmental Policy Act (NEPA), which applies to federal action and federal lands but not to wholly private endeavors,[9] and to regulators' reluctance to impose constraints on pri-

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5. *See* E.O. WILSON, THE DIVERSITY OF LIFE 253-54 (new ed. 1999).

6. National Wildlife Federation, *New NWF Report Shows Nebraska's Prairies and Their Wildlife Rapidly Disappearing* (Sept. 11, 2001), *at* http://www.nwf.org/ grasslands/nebraska_grasslands.html (last visited Sept. 12, 2001).

7. *See* U.S. BUREAU OF LAND MGMT., PUBLIC LAND STATISTICS 1990 5, tbl.4 (1990), *reprinted in* GEORGE C. COGGINS ET AL., PUBLIC LAND AND RESOURCES LAW 14 (3d ed. 1993) (depicting Iowa and Delaware as having the smallest percentage of public land within their boundaries, 0.444%).

8. *See, e.g.*, Seattle Audubon Soc'y v. Moseley, 80 F.3d 1401 (9th Cir. 1996); Seattle Audubon Soc'y v. Lyons, 871 F. Supp. 1296 (W.D. Wash. 1994); Hanson v. United States Forest Serv., 138 F. Supp. 2d 1295 (W.D. Wash. 2001).

9. 42 U.S.C. § 4332 (2000). *See* Jim Chen, *Diversity and Deadlock: Transcending Conventional Wisdom on the Relationship Between Biological Diversity and Intellectual Property*, 31 Envtl. L. Rep. (Envtl. L. Inst.) 10,625, 10,627 (2001); DAVID TAKACS, THE IDEA OF BIODIVERSITY: PHILOSOPHIES OF PARADISE 92 (1996). NEPA interjects a "look before you leap" principle with respect to the environmental consequences of major federal actions, including permitting and funding for activities on private lands. Although its mandate is purely procedural, requiring environmental analyses before action is taken, *see* Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989), NEPA has turned

vate landowners for fear of provoking takings claims.[10] This is a significant oversight. By some estimates, more than fifty percent of species listed as endangered or threatened rely on private lands for habitat,[11] as do many non-listed, but highly important, native species.[12] It is estimated that over fifty percent of North America's game species and migratory birds rely upon prairie potholes for habitat.[13] Private lands also provide important habitat for animals valued commercially for their pelts, including raccoon, muskrat, and mink.[14] Countless species of flora and fauna, including plants and insects otherwise known as weeds and pests, lacking any known commercial worth but important for their intrinsic and aesthetic value, reside on private lands as well.

Is it possible to restore and maintain biological diversity on private lands, and the waterways that course through them, in rural America? Assuming we can agree that biodiversity in general is a

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the public spotlight on the environment in the cases to which it applies, often to the advantage of ecological concerns.

10. *See* Lucas v. S.C. Coastal Comm'n, 505 U.S. 1003 (1992) (holding that the Coastal Commission had "taken" private developers' property without just compensation under the Fifth Amendment when coastal development restrictions resulted in a deprivation of all economic value).

11. *See* Dana Clark & David Downes, *What Price Biodiversity? Economic Incentives and Biodiversity Conservation in the United States*, 11 J. ENVTL. L. & LITIG. 9, 10 (1996) (indicating that fifty percent of listed species live only on private lands); U. S. GEN. ACCOUNTING OFFICE, ENDANGERED SPECIES ACT: INFORMATION ON SPECIES PROTECTION ON NONFEDERAL LANDS 4 (1995) (reporting that private land provides the majority of habitat needed by listed species); DAVID S. WILCOVE, ET AL., REBUILDING THE ARK: TOWARD A MORE EFFECTIVE ENDANGERED SPECIES ACT FOR PRIVATE LAND 2 (1996), *available at* http://www.environmentaldefense.org/documents/483_Rebuilding%20the%20Ark.html (last visited Jan. 25, 2001).

12. Buffalo and virtually any grazing animal could use private prairie or pasture lands for habitat, as demonstrated by the Great Plains Restoration Council's "Buffalo Commons," a contiguous area of one million acres of tribal, private and public lands in the Great Plains States. *See* Associated Press, *Million-Acre Project to Reintroduce Buffalo* (Aug. 26, 2001), *available at* http://www.stacks.msnbc.com/ local/knbn/m84395.asp (last visited Feb. 19, 2002). *See generally* http://gprc.org/ (last visited Nov. 8, 2001) (the Great Plains Restoration Council web-site).

13. *See* Daryn McBeth, *Wetlands Conservation and Federal Regulation: Analysis of The Food Security Act's "Swampbuster" Provisions as Amended by the Federal Agricultural Improvement and Reform Act of 1996*, 21 HARV. ENVTL. L. REV. 201, 205 (1997); Solid Waste Agency of N. Cook County v. United States Army Corps of Eng'rs 531 U.S. 159, 194 (2001) (Stevens, J., dissenting) (noting that isolated waters "'are among the most important and also [the] most threatened ecosystems in the United States' because '[t]hey are prime nesting grounds for many species of North American waterfowl . . .' [providing] '[u]p to 50 percent of the [U.S.] production of migratory waterfowl'") (quoting SEC'Y OF THE INTERIOR, REPORT TO CONGRESS, THE IMPACT OF FEDERAL PROGRAMS ON WETLANDS: THE LOWER MISSISSIPPI ALLUVIAL PLAIN AND THE PRAIRIE POTHOLE REGION 79-80 (Oct. 1988)).

14. McBeth, *supra* note 13, at 205.

laudable goal—and we are not venturing out on a limb on this one[15]—we are still a long way from a consensus on the merits of preserving the fragments of habitat provided by farms. If we can establish that farmland conservation for biodiversity purposes is an appropriate scientific and policy objective, two additional issues clamor for attention: (1) how do we go about choosing the right farms to be conserved; and (2) how should we manage the chosen farms to ensure that they remain valuable as habitat? This essay argues that farmland preservation is worthwhile from a biodiversity standpoint, and offers a few preliminary suggestions for addressing the "how" questions.

II. FARMS AS BIODIVERSITY RESERVES

As a nation, we lose over 1.5 million acres of farmland a year to development.[16] This number may seem inconsequential when compared to the total amount of farmland in the United States—over 930 million acres—and even smaller considering the nation's total land mass, about 2.1 billion acres.[17] However, taken in the aggregate, year after year, these 1.5 million acres add up. As the population of our country continues to grow, so too will the rate of development. But it's not as if a burgeoning population needs the space; instead, urban sprawl is the result of a misallocation of resources, misguided agricultural policies, and a paucity of land use planning. The Chicago area, for example, has experienced only four percent population growth in the past twenty years, but the metropolitan area has expanded by fifty percent.[18] Similar trends can be found across the nation, from

15. *See, e.g.*, Reed F. Noss, *Some Principles of Conservation Biology, as They Apply to Environmental Law*, 69 CHI.-KENT L. REV. 893, 895 (1994) (noting consensus among ecologists).

16. *See* Mark R. Reilly, *Evaluating Farmland Preservation Through Suffolk County New York's Purchase of Development Rights Program*, 18 PACE ENVTL. L. REV. 197, 198 (2000) (citing AM. FARMLAND TRUST, FARMING ON THE FRINGE 11 (July 1993)); *see also* Jeanne S. White, *Beating Plowshares into Townhomes: The Loss of Farmland and Strategies For Slowing its Conversion to Non-Agricultural Uses*, 28 ENVTL. L. 113 (1998); *Poll Shows Western Votes Support Conservation Funding for Agriculture*, U.S. NEWSWIRE, Oct. 10, 2001, 2001 WL 28752852, *2.

17. NAT'L AGRIC. STATISTICS SERV., U.S. DEP'T OF AGRIC., 1997 CENSUS OF AGRICULTURE, tbls.4, 7 & 8 (United States Data), *available at* http://www.nass.usda.gov/census (last visited Jan. 25, 2002). Farmland totals do not include commercial forestlands, which comprise about twenty-five percent of the land in the United States. *See* U.S. DEP'T OF AGRIC., PROTECTING OUR MOST VALUABLE RESOURCES 1 (Oct. 2001), *at* http://www.farmland.org (last visited Nov. 27, 2001) [hereinafter PROTECTING]; Jan S. Pauw & James R. Johnston, *Habitat Planning Under the ESA on Commercial Forestlands*, 16 NAT. RESOURCES & ENV'T. 102 (2001).

18. Reilly, *supra* note 16, at 199.

New York and Atlanta in the East to Denver and San Diego in the West.[19]

A. Agricultural Habitat

The quality of life for wildlife and human inhabitants alike is greatly diminished by the loss of our rural lands. True, farms are not bucolic, fresh green spaces where happy, healthy critters frolic and native grasses and trees flourish unimpeded by human interference. Farming has had, and continues to have, a dramatic impact on the ecological integrity of our landscape. The conversion of prairies, woods and wetlands to lands suitable for the production of crops and animal products has resulted in extensive water, air and soil pollution.[20] Indeed, the conversion of land to agricultural uses has been recognized as "one of the most significant human alterations to the global environment."[21] The loss of wetlands, areas considered by many to be the nation's most biologically productive habitat,[22] is particularly striking. Over ninety-five percent of Iowa's prairie potholes are gone, largely as the result of agricultural practices.[23] Missouri has lost nearly ninety

19. Reilly, *supra* note 16, at 199. (reporting that New York State lost over fifty percent of its farmland acres since 1950); MARC REISNER, WATER POLICY AND FARMLAND PROTECTION: A NEW APPROACH TO SAVING CALIFORNIA'S BEST AGRICULTURAL LANDS 2 (1997) [hereinafter REISNER, WATER POLICY] (describing the "metamorphosis" of farmland into suburban sprawl as the "longest-running and most insidious crises confronting the state," and detailing the transformation of Santa Clara Valley farmland into Silicon Valley and the loss of farmlands near the booming Bay Area and Los Angeles Basin). Southeastern cities are also notorious for gobbling up rural lands. Atlanta serves as a model for what not to do for cities dealing with urban sprawl, boasting a twenty county metropolitan area with the lowest house per acre density of America's largest cities. Dahleen Glanton, *Sprawl Tests Atlanta's Limits: City Pays Price for Unchecked Growth*, CHI. TRIB., Aug. 7, 2001, at 1.

20. *See* J.B. Ruhl, *The Environmental Law of Farms: 30 Years of Making a Mole Hill Out of a Mountain*, 31 Envtl. L. Rep. (Envtl. L. Inst.) 10,203 (2001).

21. P.A. Matson et al., *Agricultural Intensification and Ecosystem Properties*, 275 SCI. 504, 504 (1997). Not too surprisingly, the first plant species known to have gone extinct in the United States as a result of human activity, the Franklinia altamaha tree, was cut to clear land for farming. *See* George Cameron Coggins & Anne Fleishel Harris, *The Greening of American Law?: The Recent Evolution of Federal Law for Preserving Floral Diversity*, 27 NAT. RESOURCES J. 247 (1987).

22. *See* WORLD RES. INST., ENVIRONMENTAL ALMANAC 137 (1992); *see also*, Hope Babcock, *Federal Wetlands Regulatory Policy: Up to its Ears in Alligators*, 8 PACE ENVTL. L. REV. 307, 309 (1991) ("Wetlands are among the most productive and valuable ecosystems in the world.").

23. James W. O'Brien, *Federal and State Regulation of Wetlands in Iowa*, 41 DRAKE L. REV. 139, 147 n.53 (1992). Prairie potholes are small depressions created by glaciers. *See id.* (citing FISH & WILDLIFE SERV., IOWA DEP'T OF THE INTERIOR, WETLAND LOSSES IN THE UNITED STATES: 1780S TO 1980S, at 6 (1990)).

percent of its wetlands.[24] Other Midwestern and Great Plains states have experienced similar losses, often aided and abetted by government farm policies.[25] With the loss of wetlands comes the loss of their pollution filtering and flood control capabilities, along with essential habitat for migratory birds, amphibians, and other wildlife.[26]

Farming operations continue the assault, and biodiversity suffers as a result. Agricultural practices run the full gamut of environmental offenses, from polluted runoff to toxic air emissions. Runoff, or non-point source pollution, is the leading cause of water quality impairment in the nation, and farms are the leading contributors of runoff, literally oozing persistent pesticides and excess nutrients.[27] J.B. Ruhl was not exaggerating when he quipped, "[t]he plain truth is that farms pollute groundwater, surface water, air, and soils; they destroy open space and wildlife habitat; they erode soils and contribute to sedimentation of lakes and rivers; they deplete water resources; and they often simply smell bad."[28]

Meanwhile, almost all of the major federal environmental statutes exempt agriculture from their requirements. Most farms avoid the onerous technology-based standards and permit requirements of the Clean Water Act,[29] as well as the Act's constraints on activities that affect wetlands.[30] As small area sources, they side-step key provi-

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24. Anthony P. Farrell, *Agricultural Non-Point Source Pollution and Wetlands: A Sensible Approach*, 1 MO. ENVTL. L. & POL'Y REV. 74, 74 (1993).

25. *See* O'Brien, *supra* note 23, at 142-43. The Federal Swamplands Act of 1849 led to the transfer of 1.2 million acres of publicly held swamplands, now known as wetlands, to settlers for use as cropland. *Id.* The government further encouraged the development of land in western states, including wetlands and prairie, with the passage of the Homestead Act of 1862, the Mining Act of 1872 and various range improvement initiatives. *See* CHARLES F. WILKINSON, CROSSING THE NEXT MERIDIAN: LAND, WATER AND THE FUTURE OF THE AMERICAN WEST 82-94 (1992). State legislation has also contributed to wetlands loss. For example, the Iowa legislature encouraged drainage districts for the "leveeing, ditching, draining, and reclamation" of wetlands. IOWA CODE §§ 468.1, 2 (1989). The idea that drainage is a "public benefit" is ingrained in the fabric of American law with the "Common Enemy" Rule, which empowers private landowners to remove the enemy—water—from their property even if it causes water to accumulate on adjacent property. *See* 78 AM. JUR. 2D *Waters* § 119 (1975); O'Brien, *supra* note 23, at n.18.

26. *See* Roger L. Pederson, *Farms and Wetlands Benefit from Farm Bill Conservation Measures*, National Wetlands Newsletter (Envtl. L. Inst.) 9, 10 [Sept.-Oct.] (2001).

27. Farrell, *supra* note 24, at 74.

28. Ruhl, *supra* note 20, at 10,203.

29. *See* 33 U.S.C. §§ 1362 (14), 1342(*l*) (2000) (exempting irrigation return flows and agricultural stormwater discharges from prohibitions and technology-based requirements of the Clean Water Act). *See also* Oliver A. Houck, *TMDLs IV: The Final Frontier*, 29 Envtl. L. Rep. (Envtl. L. Inst.) 10,469 (Aug. 1999).

30. *See* 33 U.S.C. § 1344(a) (2000). Section 404 of the Act regulates discharges of dredged or fill materials into waters of the United States, including wetlands, but exempts many "normal" farming activities. *See id.* § 1344(f); 33 C.F.R. § 323.4(a)(1) (2002); *see also* Nationwide Permit #40, 65 Fed. Reg. 12,818 (2000) (authorizing discharges for

sions of the Clean Air Act.[31] Farms spread fertilizers laced with hazardous wastes without complying with waste management laws,[32] and they avoid Superfund's clean-up requirements for many of their activities.[33] The spread of non-native species and hybrids via monoculture crop production practices and the proliferation of genetically modified organisms (GMO's) are barely addressed by federal law, even though their effects on genetic diversity are well documented.[34] Like Noah and his Ark (perhaps a better analogy is Dr. Frankenstein and his monster), we have moved species around and genetically altered them willy-nilly with little to no regard for native biodiversity, most often in the name of agricultural production.[35]

Even the "pitbull" of environmental laws, the Endangered Species Act (ESA), falls only lightly on the shoulders of American farmers. In theory, farmers who destroy essential habitat could be held liable for a "take,"[36] a term which encompasses "harm" to listed species,

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farm construction or agricultural production into wetlands of one-half acre or less). In recent years, the Corps of Engineers has taken some steps to enforce the section 404 program more vigorously with respect to farming operations, *see, e.g.*, Borden Ranch P'ship v. United States Army Corps of Eng'rs, 261 F.3d 810 (9th Cir. 2001). But that may come to a halt due to the Supreme Court's opinion in *Solid Waste Agency of N. Cook County v. United States Army Corps of Eng'rs*, 531 U.S. 159 (2001) (Stevens, J., dissenting), which limits the ability to regulate activities affecting isolated wetlands.

31. *See* 42 U.S.C. § 7412 (2000) (major sources of HAPs must meet stringent technology based controls, while area sources may get phased in); *id.* § 7509 (nonattainment—major sources); *id.* § 7411 (NSPS—major sources); *id.* § 7661(a) (permit requirements—major sources).

32. *See* 42 U.S.C. § 6903(27) (2000), and 40 C.F.R. § 261.4(b) (1989) (exempting irrigation return flows and wastes generated from crop and livestock production used as fertilizer from stringent management requirements for hazardous wastes).

33. 42 U.S.C. § 9601(22)(D) (2000) (exempting the "normal application of fertilizer" from the statutory definition of "release"); 42 U.S.C. § 9607(i) (2000) (exempting the application of pesticides from cost recovery liability). *See* 42 U.S.C. § 11021(e)(5) (2000); 40 C.F.R. § 355.40(a)(2)(iv) (2001) (excluding substances emitted from "routine agricultural operations" from emergency planning and reporting requirements). For a detailed discussion of the body of "anti-law" that exempts farming from environmental requirements, see J.B. Ruhl, *Farms, Their Environmental Harms, and Environmental Law*, 27 ECOLOGY L.Q. 263, 293-316 (2000).

34. *See* Zellmer, *supra* note 3, at 1234 (discussing deficiencies in federal law regarding the control of non-indigenous aquatic species). For the potential dangers to food security and human health and the environment from GMO's, see John S. Applegate, The Prometheus Principle: Using the Precautionary Principle to Harmonize the Regulation of Genetically Modified Organisms (2001) (unpublished manuscript, on file with author). GMO's are addressed by several federal statutes, none of which fully control their creation, production, labeling, distribution, or use. *See id.*

35. *See* Applegate, *supra* note 34 (describing parallels between United States' approach to GMO's and Mary Shelley's Frankenstein, the "modern Prometheus," who, like Prometheus, was destined to pay penance for technological hubris).

36. *See* 16 U.S.C. § 1538 (2000). *See also* 50 C.F.R. § 17.3 (1975); Babbitt v. Sweet Home Chapter of Cmtys. for a Great Or., 515 U.S. 687 (1995); Palila v. Haw. Dep't of Land & Nat. Res., 639 F.2d 495 (9th Cir. 1981).

including habitat modification that "actually kills or injures wildlife."[37] In many if not most cases, however, it would be difficult to prove that an individual action, for example, converting an isolated prairie pothole into tillable acreage, resulted in the demise of a protected species, making prosecution unlikely.[38]

Further exacerbating the ESA's shortcomings, the statute fails to protect plant species on private lands. Although the foundation of the world's diversity is found in single-celled organisms,[39] the ESA—the centerpiece of domestic law's efforts at preserving biodiversity—has been most effective for charismatic megafauna like wolves and grizzly bear. The ESA's "take" prohibition does not apply to plants, so listed plant species are only protected under the statute when they are destroyed in knowing violation of state law,[40] and when a federal action, such as funding or permit issuance, triggers ESA consultation requirements.[41] Federal action on highway projects is common, but relatively rare when it comes to agricultural operations.[42] Plant species located on private land are also less likely to obtain the protection afforded by the designation of a critical habitat.[43] In fact, critical habitat is rarely designated for plant species, and recovery plans are few and

37. 50 C.F.R. § 17.3 (1975). *See Sweet Home*, 515 U.S. at 697-98 (upholding the Secretary's definition of harm).

38. Persons violate the ESA if they knowingly violate its provisions. *See* 16 U.S.C. § 1540(a)(1), (b)(1) (2000). And thus are in violation if their actions foreseeably result in the taking of listed species. *See Sweet Home*, 515 U.S. at 709 (O'Connor, J., concurring). The Act imposes only minimal fines on those who "otherwise" violate its provisions. 16 U.S.C. § 1540(a)(1) (2000).

39. *See* Chen, *supra* note 9, at 10,628 (citing Robert F. Service, *Microbiologists Explore Life's Rich, Hidden Kingdoms*, 275 SCI. 1740 (1997)).

40. *See* 16 U.S.C. § 1538(a)(2)(B) (2000). *See also* Coggins & Harris, *supra* note 21, at 247.

41. *See* 16 U.S.C. § 1536 (1973) (amended 1988) (requiring consultation for federal actions to avoid jeopardy to imperiled plant populations).

42. Although federal permits are required for the discharge of pollutants from CAFOs, see 33 U.S.C. §§ 1311(a), 1362(12), (14), and fill material in wetlands, 33 U.S.C. § 1344(a), many farming practices evade federal permit requirements. *See supra* note 29 and accompanying text (discussing CWA exemptions). Discretionary subsidies could be considered federal actions that trigger section 7 consultation requirements, but the issue has rarely been raised, perhaps because of jurisdictional difficulties. *See* Sierra Club v. Glickman, 156 F.3d 606, 620 (5th Cir. 1998) (noting that the district court had ordered ESA consultation concerning the effects of Federal Agriculture Improvement and Reform Act payments, but concluding that the issue was moot).

43. Critical habitat must be designated under the ESA unless such designation is not beneficial. *See* 50 C.F.R. § 424.12(a)(1) (1980). Often the designating agency concludes that species occupying private lands will not benefit from the designation of a critical habitat. *See* Conservation Council for Haw. v. Babbitt, 2 F. Supp. 2d 1280, 1281 (D. Haw. 1998) (finding the agency's decision not to designate a critical habitat arbitrary and capricious where the decision was based solely on a claim that some of the listed species were located on private land, but leaving open the possibility that a decision not to designate might be appropriate when the species can *only* be found on private lands).

far between when it comes to plants.[44] As a result, landowners are generally free to eradicate endangered plant species from their property whether they want to develop the land, are fearful of restrictions that may be placed upon the land due to listing, or for no reason at all.[45]

By closing some of these loopholes, we could do better, far better, in addressing agri-pollution and improving the quality of habitat in and around farms. Yet even with their problems, farms provide superior habitat than the alternative—urban sprawl, with its attendant consequences: increased emissions from motor vehicles, polluted runoff from impermeable surfaces, increased traffic and commuting time, and further habitat loss to pavement and structures, to name a few.[46] Even some of the most intensive agricultural practices can leave important seasonal habitat for migratory birds and other species. Marc Reisner, once a vigorous opponent of irrigated, subsidized farming on the arid lands of the West, recently concluded that, due to their capacity to support wildlife species, California farms should be preserved against the urban "developmental juggernaut."[47] He notes that rice farms in the Sacramento Valley, for example, are a significant food source for migratory birds, sustaining "more waterfowl than the region's four National Wildlife Refuges, with a quarter billion pounds of waste grain left after harvest."[48] Although some rice farmers burn post-harvest residues to prepare their fields for the next crop, many flood their acreage in the winter to decompose leftover straw, creating valuable wetland habitat.[49] Meanwhile, songbirds subsist on fruits from orchards and vineyards and on insects in fields, and raptors feast on rodents in field stubble.[50] No wonder "[n]early any bird,

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44. Of the approximately 700 listed plant species in 1998, only twenty-four had a designated critical habitat. *See Conservation Council for Haw.*, 2 F. Supp. 2d at 1281.

45. *See* Coggins & Harris, *supra* note 21, at 297. Consider these "practical tips for developers" from the National Association of Homebuilders: "[a]gricultural farming, denuding of property, and managing vegetation in ways that prevent the presence of [endangered] species are often employed where ESA conflicts are known to occur. This is referred to as the 'scorched earth' technique .... [D]evelopers should be aware of it as a means employed in several areas of the country to avoid ESA conflicts." Michael J. Bean, *Overcoming Unintended Consequences of Endangered Species Regulation*, 38 IDAHO L. REV. 409, 415 (2002) (citing NAT'L ASS'N OF HOMEBUILDERS, DEVELOPER'S GUIDE TO ENDANGERED SPECIES REGULATION, 107-09 (1996)).

46. *See* Reilly, *supra* note 16, at 200 n.11 (stating that non-point source pollution increases from 140-180% when farms are converted to urban use).

47. REISNER, WATER POLICY *supra* note 19, at 2.

48. *Id.* at 4.

49. *Id.*

50. *Id. See also* Marc Reisner, *Deconstructing the Age of Dams*, HIGH COUNTRY NEWS, Oct. 27, 1999, at 1, 8; Federico Cheever, *Property Rights and the Maintenance of Wildlife Habitat: The Case for Conservation Land Transactions*, 38 IDAHO L. REV. 431

mammal, amphibian or insect is apt to prefer a farmed field to a treeless new development or shopping mall."[51]

B. Small farms

Small farms, defined generally as parcels less then 500 acres owned by families or individuals, with gross annual receipts under $250,000, account for around ninety percent of America's agricultural lands and seventy-five percent of the total productive assets in agriculture.[52] Small farms contribute in significant ways to the colorful mosaic that makes up our nation's human and non-human populations.[53] Small farmers are able to optimize land holdings with crop rotation practices and integrated livestock production, providing greater diversity and ecological resilience than large, mono-culture operations.[54] By marketing at least some of their products to local farmers' markets and food co-ops, small farmers provide urban communities with social and economic connections to the land well beyond the typical mass production, supermarket experience.[55] Surveys consistently

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(2002) (observing sand hill cranes and snow geese "happily resting in fields of corn stubble" in Nebraska).

51. REISNER, WATER POLICY, *supra* note 19, at 2.

52. *See* NAT'L AGRIC. STATISTICAL SERV., U.S. DEP'T OF AGRIC., 1997 CENSUS OF AGRICULTURE 6, Fig. 2 (United States Data), *at* http://www.nass.usda.gov/census (last visited Dec. 1, 2001). *See also* U.S. DEP'T OF AGRIC., A TIME TO ACT: A REPORT OF THE COMMISSION OF THE USDA NATIONAL COMMISSION ON SMALL FARMS 28 (Misc. Pub. 1545 1998) [hereinafter U.S. DEP'T OF AGRIC., A TIME TO ACT], *available at* http://www.reeusda.gov/agsys/smallfarm/ncosf.htm (describing small farms as those "with less than $250,000 gross receipts annually on which day-to-day labor and management are provided by the farmer and/or the farm family that owns the production or owns, or leases, the productive assets"). On average, eighty percent of a farm's gross sales are absorbed by farming expenses. *See id.* at 28-29 (citing Table, Economic Research Service from the 1991-1994 Farm Costs and Returns Survey).

53. *See* Wendell Berry, *The Whole Horse*, *in* THE NEW AGRARIANISM: LAND, CULTURE, AND THE COMMUNITY OF LIFE 63 (Eric T. Freyfogle ed., 2001) [hereinafter THE NEW AGRARIANISM].

54. *See* U.S. DEP'T OF AGRIC., A TIME TO ACT, *supra* note 52, at 30.

55. *See id.* at 30. *See also* Eric T. Freyfogle, *Introduction: A Durable Scale*, *in* THE NEW AGRARIANISM, *supra* note 53, at xiv (2001) (stating that farmsteads "have linked humankind to other forms of life, to soil and to rains, and to cycles of birth, death, decay and rebirth"); Dan Imhoff, *Linking Tables to Farms*, *in* THE NEW AGRARIANISM, *supra* note 53, at 17 (describing experiences with community-supported agriculture). On average, agricultural products travel over 1,300 miles before they reach the American table, disassociating Americans with their food sources and the land itself. *Id.* at 20 (citing Amory Lovins et al., *Energy and Agriculture*, *in* MEETING THE EXPECTATIONS OF THE LAND: ESSAYS IN SUSTAINABLE AGRICULTURE AND STEWARDSHIP (Wes Jackson et al. eds., 1984)). *See also* ERIC SCHOSSLER, FAST FOOD NATION (2001) (remarking that people "rarely consider where food came from, how it was made, [and] what it is doing to the community around them . . . The whole experience is transitory and soon forgotten.").

demonstrate public support for preserving the family farm, a "functional landscape . . . that anchors community characteristics."[56]

Perhaps it is not entirely unwarranted that small farms have a near-mythical status, almost as difficult to shake as that giant in American culture, the cowboy, and perpetuated by contemporary music icons Willie Nelson and John Mellencamp. Although the struggle to save the family farm has been glorified in popular culture and ensconced in agricultural law, farmers without the resources to expand or invest in new technology are still finding it hard to compete with today's efficient large-scale farming operations.[57] With the dropping price of commodities and escalating cost of production, many small farms are unable to survive, leading to larger and fewer farms.[58] Of course, the economic challenge facing the small farmer is not a new phenomenon. The Great Depression ushered in the New Deal and a new era of federal subsidies designed to artificially inflate crop prices, insulating farmers from market pressures while securing a cheap food supply.[59] The combined effect of subsidy programs prompts farmers to utilize all fertile lands available and increase chemical inputs in order to obtain a maximum profit margin, or else get out of business altogether.

Like the cowboy, the small farmer enjoys numerous legal "safe harbors." Yet it is no mystery that farms classified as "small" contribute to environmental degradation.[60] Moreover, small areas are not necessarily the most desirable in terms of maintaining biodiversity, even if they are relatively natural and uncontaminated. Most ecologists agree that large blocks of contiguous habitat are necessary to provide migratory corridors to broad-ranging species and to support reproductive diversity.[61] But habitat fragments are better than noth-

56. *See* Reilly, *supra* note 16, at 211. Of course, it is possible that some of this support will dissipate if taxpayers are asked to pay for farmland conservation out of their own pocket.

57. *See* Michael R. Taylor, *The Emerging Merger of Agriculture and Environmental Policy: Building a New Vision for the Future of American Agriculture*, 20 VA. ENVTL. L.J. 169, 176 (2001).

58. *See* Ruhl, *supra* note 33, at 330.

59. *See* Taylor, *supra* note 57, at 172-74. Some farm programs boost yields while others suppress it to drive up prices. *See id.*

60. Jim Chen, *Get Green or Get Out: Decoupling Environmental from Economic Objectives in Agricultural Regulation*, 48 OKLA. L. REV. 333, 336, 341 (1995) (disputing "the frequently invoked but rarely tested assumption that small farm size and family ownership guarantee sound stewardship"); Ruhl, *supra* note 33, at 333 n.400 ("Small farms are a major part of the [environmental] problem.").

61. *See* Bradley C. Karkkainen, *Biodiversity and Land*, 83 CORNELL L. REV. 1, 12 (1997).

ing. Some small areas may be critical biodiversity "hotspots",[62] while others, even those that are less than pristine, contribute to diversity by creating buffers, nesting areas, resting places, and forage for migratory birds and other species.[63] Holly Doremus makes a strong case for preserving small and ordinary places for their biodiversity potential, both because setting aside only "special" wild places is unlikely to protect a wide range of biotic resources over the long-term, and because people need to feel a connection with nature as an accessible, familiar component of their everyday lives before they care enough to commit to conservation.[64] Small *is* beautiful. Returning to our Suessian theme, recall that the town of Whoville was saved only when its tiniest member exerted himself.[65]

Given that few species other than the human kind prefer pavement as their primary habitat, and that polluted runoff dramatically increases when farmland is converted to urban use, a small farm is almost always preferable, in varying degrees, to a strip mall for conservation of both biodiversity and social diversity (not to mention food supply).[66] The task, then, is to explore viable ways to identify and prioritize land for conservation, enabling us to preserve small farms along with their fertile lands and valuable habitat. Prioritization of agricultural lands will also help in creating a "tool box" of environ-

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62. *See* WILSON, *supra* note 5, at xxii (describing the ecological richness of hotspots, and noting that only seventeen hotspots, covering only 1.3% of the land surface, contain forty percent of identified plant species worldwide). *See also* John Kunich, *Preserving the Womb of the Unknown Species with Hotspots Legislation*, 25 HASTINGS L.J. 1149, 1253 (2001) (noting similar findings); Karen M. Rodriguez & Ronald A. Reid, *Biodiversity Investment Areas: Rating the Potential for Protecting and Restoring the Great Lakes Ecosystem*, 19 ECOLOGICAL RESTORATION 135, 137-40 (2001) (identifying numerous "biodiversity investment areas" in coastal areas in the Great Lakes region based, in part, on the presence of "clusters of exceptional biodiversity" given habitat and species diversity).

63. *See* Karkkainen, *supra* note 61, at 12.

64. *See* Holly Doremus, *Biodiversity and the Challenge of Saving the Ordinary*, 38 IDAHO L. REV. 325 (2002). *See also* Holly Doremus, *The Special Importance of Ordinary Places*, 23 ENVIRONS ENVTL. L. & POL'Y J. 3, 4 (2000).

65. DR. SEUSS, HORTON HEARS A WHO (Random House 1954).

66. *See supra* note 48 and accompanying text (documenting adverse environmental effects of urban sprawl). Beyond environmental degradation, urban sprawl reduces the quality of life for humans in many other ways. *See* T. Edward Nickens, *Paved Over and Pushed Out*, 39 NATIONAL WILDLIFE 3645 (2001), *available at* http://www.westlaw.com. It encourages an automobile-based way of life, creating a plethora of health problems, from asthma caused by smog generated by cars to obesity due to a lack of exercise (again, cars are a major culprit). *See* Lyle V. Harris, *CDC Report Finds Sprawl a Hazard to Public Health*, THE HARRISBURG PATRIOT, Nov. 2, 2001, at A11. Researchers also link urban sprawl to stress and depression, chronic bronchitis, low birth weight in babies, lung cancer, and heart disease. *See* Martin Mittelstaedt, *When A Car's Tailpipe Is More Lethal Than a Car Crash*, THE GLOBE & MAIL, Sept. 29, 2001, at F9.

mental programs to use in maintaining quality habitat in an area as yet left largely unregulated.

III. CHOOSING THE "RIGHT" FARMS FOR CONSERVATION

Determining which private lands are worthy of public resources for purposes of conservation is a tall order, one which can't be met with any one bright line rule. Considering the diverse geographic regions of the United States, from the mountains to the valleys, and from coastal wetlands to arid deserts, trying to compare a parcel of prime cropland in the Cornbelt of the Midwest to one in Napa Valley is just as difficult as comparing the fruits of those lands. In order to prioritize farmlands for conservation purposes, we need to specify relevant factors that help identify and rank the environmental and social values of a given farm, orchard or ranch, or we are just mixing up apples and oranges, or grapes, as the case may be.

Ecologists generally agree that a region must possess certain characteristics to support biodiversity, in particular, a variety of ecosystem types and successional stages, ecological and evolutionary processes representative of non-managed lands, and viable populations of native species.[67] In keeping with these objectives, a range of criteria can assist in identifying locations with high biodiversity value: (1) the potential for large reserve size; (2) geographic distribution of a rich variety of species; (3) the presence of rare or endemic species or communities; and (4) a variety of ecosystem types.[68] The "naturalness" of the area may also be considered, but not as a primary conservation criterion because many species are not confined to wild places, and because "naturalness" conveys a subjective element that the other criteria largely avoid.[69] Restoration potential may instead serve as a fifth consideration.[70]

Depending on geographic location and habitat features, the size of a particular parcel may, in some cases, be determinative, but this first criterion should not automatically disqualify small farms. In

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67. *See* Noss, *supra* note 15, at 893; Glen Barry et al., *Evaluation of Biodiversity Value Based on Wildness: A Study of the Western Northwoods, Upper Great Lakes, USA*, 21 NAT. AREAS J. 229-30 (2001) (citing REED F. NOSS & ALLEN COOPERRIDER, SAVING NATURE'S LEGACY: PROTECTING AND RESTORING BIODIVERSITY 8 (1994)).

68. *See* Barry et al., *supra* note 67, at 229-230 (citing Noss and other authorities); Rodriguez, *supra* note 63, at 136-37 (listing similar biodiversity criteria).

69. Barry et al., *supra* note 67, at 230. Truly natural or "pristine" habitat may be impossible to find, given the pervasive effects of anthropogenic activity in every corner of the world.

70. *See* Rodriguez & Reid, *supra* note 62, at 136-37 (noting that, particularly for lands extensively altered by human activities, efforts should be focused on smaller "biodiversity investment areas" with restoration potential).

most areas of the country, extensive fragmentation of habitat has occurred, making large tracts difficult if not impossible to assemble, and preserving smaller fragments is essential to protect what little habitat that remains.[71] Further, the size of the parcel may be less important for certain species. While large predators typically need expansive tracts of contiguous habitat, fragmented but high quality habitat may be sufficient for other species.[72] Lands that represent biodiversity hotspots, providing habitat for species on the verge of extinction or important keystone species, and lands that support critical life stages of rare or sensitive species or provide migratory stop-overs or corridors should also be ranked highly, regardless of size.[73] Additionally, farmlands that serve as "buffer zones" due to their proximity to protected reserves are valuable for limiting the spillover effects of development on those reserves.[74]

The remaining criteria require detailed ecological information regarding the distribution of species and the type and quality of habitat offered by the land. The need for ecosystem diversity means that no single feature or habitat type can serve as the sole mark of "good" habitat. Having said that, if we had to choose a starting point for farmland conservation, wetlands would be a good bet. A fair amount of data exists on wetlands, providing a toehold on informational needs. Wetlands are extremely valuable both for promoting species diversity and for their ability to restore water and soil quality by collecting and filtering nitrogen, phosphorus, and sediments.[75] One study indicates that nitrate levels of water filtered through wetlands are reduced by nearly ninety percent.[76] When conditions are right, wetlands also promote the decomposition of waste organic compounds.[77]

Existing farm conservation programs already recognize the importance of wetland preservation.[78] They also single out certain uplands for conservation efforts, not because of their proximity to wet-

71. *See* Rodriguez & Reid, *supra* note 62, at 137.

72. *See* Barry et al., *supra* note 67, at 230.

73. *See id.* at 230. The loss of a "keystone" species causes a "substantial part" of the ecological community to experience drastic change. WILSON, *supra* note 5, at 164. *Cf.* Doremus, *supra* note 64, at 325 (noting ecologists have difficulty defining the keystone concept or identifying keystone species, and concluding that preserving listed, indicator, keystone or umbrella species is insufficient for accomplishing biodiversity goals).

74. *See* Karkkainen, *supra* note 61, at 13.

75. *See* McBeth, *supra* note 13, at 206.

76. Daryl Smith, *Wetlands: Let's Leave Well Enough Alone*, STAR TRIB., Feb. 5, 1992, at 15A.

77. *See* WILLIAM J. MITSCH & JAMES G. GOSSELINK, WETLANDS 524 (2d ed. 1993).

78. *See infra* Part IV.B. (discussing federal agricultural conservation programs).

lands or surface waters, but because of their erodibility.[79] Alteration and loss of vegetation from highly erodible lands can result in a loss of topsoil and polluted run-off into surface waters. If preserved, hilly terrain, like wetlands, can provide valuable shelter and other habitat attributes.

Obviously, these ecological criteria will require fine-tuning and ground-truthing to play a meaningful role in conserving biodiversity on private lands. Meanwhile, social factors could and probably should play some role in choosing priority farmland, as people, particularly landowners, are an inevitable part of ecosystem diversity on private lands, and public support will be necessary to implement any program that calls for public funds.[80]

From a socio-economic standpoint, agricultural lands likely to experience development pressure in the foreseeable future may receive higher conservation priority.[81] If the lands are not facing development pressure, the farmer has little incentive to sell and there is less reason to expend public resources to preserve them. Further, some farms may be more suitable for preservation because of the value of their crops. Farms growing heavily subsidized commodity crops may have less value, for conservation purposes, than others. Between 1985 and 1994, over $75 billion were spent on subsidizing corn, sorghum, barley, oats, wheat, rice, and cotton; prioritizing farms that produce these crops seems economically dubious.[82] Similarly, the public may be more supportive of expenditures for farms that provide habitat for commercially valuable wildlife. Hunters spend hundreds of millions of dollars each year to hunt waterfowl and game in the prairie potholes of the Great Plains states and on western range lands.[83] Lands might also qualify by nature of ownership, with preferences given to small farmers who live on the land rather than factory farms and corporate conglomerates.

The difficult task will be figuring out how to weigh selected ecological and social factors to reach an acceptable outcome. Placing undue emphasis on any single factor will likely produce unwanted results, particularly if social factors are given greater or even equal weight as ecological factors. For instance, if we prioritize lands used for high-value crops grown in only the most temperate areas of the

79. *See infra* Part IV.B. *See also* Pederson, *supra* note 26, at 11-12 (describing success of Conservation Reserve Program (CRP) in protecting habitat).

80. *See* Rodriguez & Reid, *supra* note 62, at 137 (describing "biodiversity investment areas" as "geographic zones that include the people who live there, rather than isolated sites devoid of humans . . . because through their singular or collective actions [people] both threaten biodiversity and help protect or restore it").

81. *See* REISNER, WATER POLICY, *supra* note 20, at 14-15.

82. *See* Taylor, *supra* note 57, at 176.

83. *See* McBeth, *supra* note 13, at 205.

U.S. (avocados and red bell peppers come to mind), most of the Midwestern and Great Plains states would be ineligible for conservation programs. Yet the prairie potholes and other wetlands of this region play a critical role in maintaining resident and migratory species and in minimizing the flow of pollutants to streams and rivers, protecting the water quality and overall habitat attributes of estuaries across the nation. Where biodiversity is the ultimate goal, social considerations must play a secondary role in crafting a comprehensive array of selection criteria and an effective set of conservation tools for preserving and managing priority lands. Otherwise, we risk losing sight of the goal altogether, and will end up with whatever measures are expedient enough to garner political acceptance at any given moment.[84]

Regardless of the chosen criteria, and the weights given to those criteria, good information about the habitat quality of the lands in question is essential so that the specified criteria can be used to "screen" the land for conservation value. Information about biological resources on private lands is limited—different parties possess mere fragments of data, and have little to no incentive to centralize the data in any user friendly, readily accessible format. Rudimentary information can be gleaned from the Department of Agriculture's records on farm subsidies and conservation programs for use as an initial "course" screen, but detailed ecological data must then be collected and analyzed for use in "fine" screening and prioritization of the land.[85] The means of acquiring the relevant data will depend, in part, on whether a farmland conservation plan includes only voluntary landowners, in which case applicants should be motivated to self-report, perhaps with technical assistance from the county, state, or federal levels. If instead the plan involves compulsory components, reports on habitat characteristics and farming practices may be compelled. A variety of voluntary and compulsory approaches are explored below.

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84. *See* Oliver A. Houck, *On the Law of Biodiversity and Ecosystem Management*, 81 MINN. L. REV. 869, 952-53 (1997) (concluding that precise, objective, species-based management criteria are crucial for preserving ecosystem biodiversity).

85. *See* Barry et al., *supra* note 67, at 232 (discussing informational needs). Partnerships between the U.S. Geological Survey, the Natural Resource Conservation Service, state natural resource agencies and county extension agents can assist in collecting and assessing data on farm habitat. *See* http://www.usgs.gov/fs-016-99.pdf (detailing efforts to gather data on wetland complexes and land use in Iowa) (last visited Dec. 8, 2001).

IV. CHOOSING THE RIGHT TOOLS FOR PROMOTING FARMLAND BIODIVERSITY

Once high quality farmlands have been identified, we must effectively utilize existing programs or adopt and implement new ones to assure that these lands remain valuable as habitat, whether in conservation or production status. Many farmers think of themselves as environmental stewards,[86] but they are also an extremely pragmatic bunch, harboring a highly utilitarian view of their lands. While they don't run around quoting British philosophers and lords (at least not on a regular basis), their view of property ownership has been indelibly shaped by Sir William Blackstone, who described it as "that sole and despotic dominion . . . over the external things of the world, in total exclusion of the right of any other . . . ."[87] Christian theology has probably had a more tangible influence: "replenish the earth, and subdue it; and have dominion . . . over every living thing that moveth upon the earth."[88] It would be nice to counter this sentiment by instilling a "Land Ethic,"[89] perhaps by educating our children about the virtues of conservation from day one of their grammar school experience, but until that happens we need some powerful tools to help us along the way.

There is no one "magic bullet" solution.[90] An array of environmental initiatives, crossing the full spectrum of jurisdictional authorities at every level of control, are necessary to encourage and, in some cases, force human beneficiaries of nature's bounty to keep nature's

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86. *See* Wendell Berry, *The Boundary*, *in* THE NEW AGRARIANISM, *supra* note 53, at 239.

87. 2 WILLIAM BLACKSTONE, COMMENTARIES (Edward Christian ed., A Strahan 1823) (1800). Although it is unlikely that landowners enjoyed unfettered rights to real property when Blackstone penned this phrase, the concept seems to have taken on a life of its own and still exerts influence today. *See* Eric T. Freyfogle, *The Owning and Taking of Sensitive Lands*, 43 UCLA L. REV. 77, 99 (1995). Locke's labor theory has also been influential. *See* JOHN LOCKE, TWO TREATISES OF GOVERNMENT, BOOK II, Ch. V (Palladium Press 2000) (1821)(1690) ("Whatsoever then he removes out of the state that nature has provided, . . . he has mixed his labor with, and joined to it something that is his own, and thereby makes it his property . . . exclud[ing] the common right of other men.").

88. *Genesis* 1:28. *See* James R. Rasband, *The Rise of Urban Archipelagos in the America West: A New Reservation Policy?* 31 ENVTL. L. 1, 5 (2001) (observing that a growing majority of people are in favor of preservation for "moral" purposes, but noting these purposes could be self-serving).

89. *See* ALDO LEOPOLD, A SAND COUNTY ALMANAC, AND OTHER ESSAYS (Eihosha Ltd. 1995) (1947) ("a thing is right . . . when it tends to preserve nature"). *See also* John Copeland Nagle, *Playing Noah*, 82 MINN. L. REV. 1171, 1176 (2000) (quoting former Interior Secretary Bruce Babbitt on environmental preservation, recognizing "the moral and spiritual imperative that there may be a higher purpose inherent in creation, one demanding our respect and our stewardship").

90. *See* Doremus, *supra* note 64, at 348.

best interests at heart. At base, a comprehensive conservation program should have two tracks: (1) conserve high quality farmlands from urban encroachment, and (2) ensure that those farms retain their habitat values whether they remain operational or are placed in conservation reserve status. This Essay could not hope to do justice to the full range of possibilities for either objective. Instead, we will simply lay the salient options on the table, looking at both incentive-based and regulatory programs, some already in existence and some, as yet, only proposed. The goal here is to sketch out a set of potential tools that can be used for conservation, given the diverse challenges and opportunities presented by agriculture.

A. Conserving Farmland

1. State Conservation Programs

Perhaps the most expedient way to protect farmlands from urban sprawl is through state and local growth management—in common parlance, "Just say no!" But this approach takes tremendous political fortitude, particularly in rural areas, as land use planning flies in the face of staunchly held beliefs in "manifest destiny and . . . the enjoyment of God given property rights."[91] So local authorities need some help.

Preserving open space is a legitimate goal, justifying the exercise of state police powers.[92] States may require local governments to adopt comprehensive plans consistent with statewide preservation goals, or they may take a more limited approach by providing for agricultural districts to preserve farmland. The State of Oregon does both. It requires comprehensive planning to assure sustainable land use practices and it permits counties to designate "exclusive farm zones," where non-farm uses are prohibited.[93] States can support agricultural

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91. A. Dan Tarlock & Sarah B. Van de Wetering, *Growth Management and Western Water Law From Urban Oases to Archipelagos*, 5 HASTINGS W.-N.W. J. ENVTL. L. & POL'Y 163, 166 (1999). *See supra* note 87 (describing Blackstonian sentiments regarding land ownership).

92. *See* Stephens v. Raleigh County Bd. of Educ., 257 S.E.2d 175 (W. Va. 1979); Boundary Drive Assocs. v. Shrewsbury Township Bd. of Supervisors, 473 A.2d 706 (Pa. Commw. Ct. 1984), *aff'd*, 491 A.2d 86 (Pa. Super. Ct. 1985); Reed v. Rootstown Township Bd. of Zoning Appeals, 458 N.E.2d 840 (Ohio 1984). *See also* Wilson v. County of McHenry, 416 N.E.2d 426 (Ill. App. Ct. 1981) (upholding a restriction on construction of non-farm dwellings in agricultural districts).

93. OR. REV. STAT. §§ 197.175(2); 215.203(1) (1999). *See* Steven C. Bahls, *Preservation of Family Farms—The Way Ahead*, 45 DRAKE L. REV. 311, 316 (1997). *See also* White, *supra* note 16, at 119 (reporting that the loss of farmland to urban development dropped from 30,000 acres per year to 10,000 acres per year after the adoption of Oregon's plan).

zones or districts by providing favorable tax treatment for farmland, exemptions from special assessments for water and sewer, marketing and technical assistance, grants or loans for infrastructure, and protection from eminent domain.[94]

Local governments in many states, however, fail to engage in any significant land use planning for rural areas.[95] Those that do control rural development often include so many protections for the landowner that zoning authorities fear taking an aggressive stance on any particular issue, given the likelihood that a board of appeals or court will overturn them.[96]

States can do their part by supporting local land use planning initiatives, but also by acquiring property, either as fee simple interests or conservation easements. In Florida, a water management district, using a combination of acquired lands and conservation easements, is restoring a 13,000 acre area of former wetlands near Lake Apopka, creating a natural filter to clean nutrients from the lake.[97] Minnesota, Missouri and Illinois, motivated by the floods of 1993, have implemented acquisition programs along the Mississippi River and its tributaries, preserving flood-prone lands by converting them to wetlands.[98] Ohio, New York and several other states have adopted programs to purchase development rights from farmers and impose conservation easements on the land.[99]

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94. *See* Bahls, *supra* note 93, at 316-17. *See also* White, *supra* note 16, at 118, 126-132 (discussing zoning requirements and agricultural districts in Oregon, New York, and King County, Washington). States have also enacted "right to farm" laws to protect normal farming activities from nuisance claims. *See* Bahls, *supra* note 93, at 317-18.

95. All states grant land use powers to localities through zoning enabling acts, but the extent to which local governments have made use of their authority varies significantly. *See* FRED P. BOSSELMAN, THE IMPACT OF THE DOUGLAS COMMISSION OF LOCAL PLANNING, C851 ALI-ABA 433, 447-50 (1993).

96. *See generally* White, *supra* note 16, at 123-24 (describing enforcement problems). Reluctance stems from strong state "takings" provisions, ready availability of variances and special exceptions, and lack of resources to defend zoning restrictions in court. This means that zoning is not an especially durable tool for conserving biodiversity—zoning requirements can vary significantly, as can enforcement priorities, based on political whim.

97. *See* McBeth, *supra* note 13, at 212-13. The state legislature approved $20 million to acquire private lands along the lake's shoreline. *See id.*

98. *See* John Tibbetts, *Waterproofing the Midwest*, PLANNING, Apr. 1, 1994, 1994 WL 13512763, *9 (describing Minnesota as a leader in acquiring flood-prone agricultural land and retiring it; "in the long run, the cheapest way to reduce flood damage is to buy out agricultural areas and turn them into wetlands"). *See also* Lia Dean, *Flood Buyouts Work, National Study Finds U.S. Wildlife Group Hails Programs Used by Missouri, Illinois Wants Other States to Join*, ST. LOUIS POST-DISPATCH, July 17, 1998, at A4 (reporting on voluntary buy-outs by Missouri and Illinois to turn flood-damaged residences into reserves).

99. Ohio has designated $25 million, out of a $400 million "brownfields" bond issue approved by voters in 2000, to purchase farm development rights over the next four

While these acquisition programs are laudable, most are grossly underfunded, lack avenues for public input, and are focused too heavily on lands in proximity to growing metropolitan areas rather than habitat needs.[100] With more generous funding levels and appropriate criteria to ensure that lands with positive habitat values are selected for conservation, these programs could provide significant conservation benefits. Perpetual restrictions are probably ideal from the biodiversity standpoint; however, farmers may be less likely to sign their lands up for perpetual restrictions. Many farmers whose land is the family's principal asset believe that permanent constraints unfairly minimize the options of children who will someday inherit the land. Programs that impose restrictions for a defined period, with incentives for those who sign up for permanent restrictions, may be more likely to entice farmers to participate.[101]

Property taxes also have an impact on the conservation of biodiversity on private lands. Agricultural lands are typically taxed at a lower rate, but the taxes that are imposed can still be economically crippling for farmers who are not obtaining maximum output from the land (and even for some who are), increasing the pressure to sell and discouraging participation in conservation programs.[102] It does not

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years. *See* Jane Schmucker, *Ohio to Pay Farmers for Saving Their Land*, TOLEDO BLADE, Dec. 2, 2001, at H1. The state anticipates paying willing farmers the difference between agricultural and development value, which it estimates will be around $1,500 per acre, allowing the purchase of over 16,000 acres. *Id.* Under a similar program, Michigan has purchased development rights for almost 14,000 acres of farmland since 1994. *Id. See also* Reilly, *supra* note 16 (discussing Suffolk County, New York's program). Congress' Farmland Protection Program also acquires development rights from willing farmers threatened by sprawl. *See* Press Release, Environmental Working Group, *Environmental Groups Applaud New Harkin Farm Bill* (Dec. 5, 2001), *at* http://www.ewgorg/ pressreleases/pr20011205.html [hereinafter *New Harkin*].

100. The Ohio program, which prioritizes those lands most under pressure from development by sprawling metropolitan centers, requires that twenty-five percent of the purchase price be paid by local government or a charitable organization. *See* Schmucker, *supra* note 99, at H3. The director of the state preservation office admits that, to date, no local government has set aside money for purchasing farm development rights, and voters in several counties have rejected sales tax proposals to raise money for farmland preservation. *See id.*

101. *See* REISNER, WATER POLICY, *supra* note 19, at 20. Reisner recommends a twenty-year period, based on polls of California growers and predictions of voter acceptance of subsidies for farmers, as well as long-term habitat needs. *Id.*

102. California tax assessors, for example, have been required to estimate property values to their highest potential use, even if current agricultural receipts were less than taxes owed on the property. *See* Timothy J. Baldwin, *Continuing to Fine Tune the Williamson Act*, 32 MCGEORGE L. REV. 791, 792 (2001). To counteract development pressure, the state legislature adopted a measure providing a tax incentive for farmers who contract with local officials to leave their land undeveloped. *Id.* (citing CAL. GOV'T CODE § 51200 (West 1983)). *Cf.* Tom McAvoy, *State Tax Policy Called Boon to Retail Growth*, THE PUEBLO CHIEFTAIN, Aug. 15, 2001, *available at* http://www.chieftain.com/

take a certified public accountant to figure out that a farmer who receives $9,000 in annual Conservation Reserve Program (CRP) payments but pays out $3,000 in property taxes to the county government cannot make it without some other source of income.[103] State or federal subsidies for farmland conservation, paid to either the local government in lieu of property taxes or to the farmers themselves, could alleviate the tax burden, making conservation more feasible.[104]

2. Federal Monetary Incentives

For small farms, monetary incentives are a critical component of any conservation initiative. There, we've said it—give more subsidies and tax breaks to farmers to encourage conservation. But do it in a way that conserves valuable habitat rather than marginal lands. Meanwhile, severely cut subsidies for surplus commodity crops to get the necessary funds for conservation programs.[105]

The U.S. Department of Agriculture, the primary "mover and shaker" in the farming world, takes the lead in encouraging agricultural output, but it is also charged with a lesser known mission—preserving genetic diversity.[106] For private lands the USDA does this primarily through research and various farm conservation programs, doling out money to farmers who place their lands in conservation status. Some programs "retire" farmland, while others reward environmentally sound management practices.

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display/archive/2001-/aug/15/niz.htm (reporting that local governments compete for large shopping malls that generate sales taxes to make up for short-falls resulting from low residential property tax rates).

103. These figures are based on CRP and tax records for a quarter section of farmland in Woodbury County, Iowa, with CRP payments based on previous years' corn production. On average, Iowa farmers actually receive far less in annual federal subsidies, around $1,100 per year, while the top ten percent of producers receive around $39,900 per year—two-thirds of all subsidies received state-wide. *See* ENVTL. WORKING GROUP, FARM SUBSIDY DATABASE (1996-2000), *at* http://www.ewg.org/farm/state.php?fisps=19 (last visited Dec. 8, 2001).

104. In terms of dollars and cents, local governments should be able to bear a significant portion of these cuts; farms, forests and open space cost, on average, $0.37 per acre in community services, while urban areas cost $1.15. *See* Reilly, *supra* note 16, at 201 n.23.

105. Less than ten percent of all agricultural support programs go toward conservation. *See* Steve Tartar, *Battle is on Over Next Farm Bill*, PEORIA J. STAR, Aug. 14, 2001, at C1 (reporting that the greatest proportion of federal subsidies goes to commodity supports for large agricultural enterprises).

106. *See* 7 U.S.C. § 427 (2000); Found. on Econ. Trends v. Lyng, 943 F.2d 79, 80-81 (D.C. Cir. 1991) (describing Department's role in preserving plant diversity). *See also* 16 U.S.C. § 1604(g) (2000) (requiring diversity of species on National Forests managed by the Department).

According to the latest farm census data, the total acreage conserved under two key conservation programs, the Conservation Reserve Program (CRP) and the Wetlands Reserve Program (WRP), is almost 30 million acres, divided among 225,000 farms.[107] While these "green payment" programs have preserved open space and restored habitat,[108] farms favored by the programs may be located in areas that are not particularly desirable from a biodiversity standpoint.[109] Because farmers get to choose whether and when their lands will be proposed for conservation status, a decision that is typically driven by commodity prices and individual economic circumstances, essential habitat gets left out while marginal lands are included.[110]

To be eligible for retirement under the CRP, a program adopted to prevent the loss of topsoil, cropland must be considered highly erodible.[111] The eligibility criteria have been broadened to include lands that contribute to serious water quality problems or provide important wildlife habitat or substantial environmental benefits if devoted to specified conservation uses.[112] Although the CRP's primary focus is the protection of erodible slopes, the program has had beneficial effects for wetlands and lowland depressions included within CRP parcels.[113]

The WRP is specifically tailored to protect wetlands by providing a means to retire marginal farmland while restoring degraded wetlands. Landowners participate by providing permanent or semi-

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107. See NAT'L AGRIC. STATISTICS SERV., U.S. DEP'T OF AGRIC., 1997 CENSUS OF AGRICULTURE, at 19, tbl.7 (United States Data), *available at* http://www.nass.usda.gov/census. USDA's census, conducted every five years, is compiled from forms sent to all known ranchers and farmers, who are required by law to provide the requested data. *Id.*

108. *See* Testimony of Jeff Nelson, Operations Director, Ducks Unlimited, Inc., before the Senate Committee on Agriculture (June 6, 2001) (advocating greater investments in farm conservation programs like CRP, which provide substantial benefits for wildlife, air, soil and water quality, while allowing farmers to hold on to the land by helping pay farm mortgages and living expenses during lean times); PROTECTING, *supra* note 17 (noting public support for increased spending on conservation programs and less money for commodity production).

109. *See* Christopher Kelley & James Lodoen, *Federal Farm Program Conservation Initiatives: Past, Present, and Future*, 9 NAT. RESOURCES & ENV'T 17, 67 (1995). Farmers in fifteen commodity-crop states receive 75% of all USDA spending. *See New Harkin*, *supra* note 99.

110. See Tina Adler, *Prairie Tales: What Happens When Farmers Turn Prairies into Farmland and Farmland into Prairies*, 149 SCI. NEWS 44, 45 (Jan. 20, 1996) (reviewing research demonstrating that commodity prices play the biggest role in farmers' decisions to enroll in the CRP program).

111. *See* 16 U.S.C. §§ 3831-36 (2000).

112. Ciro D. Rodriguez, *Conservation Grants Available To Local Area Farmers*, Fed. Doc. Clearing House, October 11, 2001. CRP payments vary depending on the "base" crop to which the lands had been devoted, with an annual average of $46 per acre and $4300 per farm. *Id. See* FARM SUBSIDY DATABASE, *supra* note 103.

113. *See* Pederson, *supra* note 26, at 11.

permanent conservation easements to the federal government, or they may enter into long-term cost-sharing agreements to restore wetlands while maintaining ownership of the land.[114] Although nearly one million acres have been enrolled in the WRP, the program is underfunded and the congressionally imposed cap on enrolled acreage will soon be exceeded.[115]

Other federal conservation programs include the Environmental Quality Incentives Program (EQIP) and the Wildlife Habitat Incentives Program (WHIP). EQIP provides technical and financial assistance to farmers who implement conservation plans to protect ground and surface waters.[116] Conservation plans range from integrated pest management for reduction of pesticide application to creation of filter strips to reduce run-off from fields.[117] Under WHIP, the USDA shares the cost of habitat development plans to encourage restoration of fish and wildlife habitat on farmlands.[118]

Not only have all of these programs been historically underfunded, but appropriations continue to fall far short of demand and seem to be dwindling as a percentage of overall agricultural spending with every passing year. During 1996 and 1997, of the total aid monies given out to farmers, twenty-six percent was conservation spending, but this figure fell to only six percent in 2000.[119] Meanwhile, seventy-five percent of farmers seeking CRP funds were rejected, and seventy percent of farmers seeking funding to improve water quality, ninety percent of farmers offering to sell development rights in open spaces, and three thousand farmers offering to restore over 550,000 acres of wetlands were turned away due to inadequate funding.[120] Dismal as these figures are, they do not fully reflect funding shortfalls. For every farmer who does apply for conservation programs there is at least another who may be willing but, aware of funding short-falls and put off by government red-tape, decides not to bother with the application process.[121]

Reverse incentive programs reach farmers regardless of whether they choose to "opt in" to conservation programs. The Swampbuster program causes farmers who convert wetlands to crop production to

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114. *See* 16 U.S.C. §§ 3837-3837f (2000). *See also* Pederson, *supra* note 26, at 11 (reporting that permanent easements are the most popular choice among farmers).

115. *See* Pederson, *supra* note 26, at 11; Farrell, *supra* note 24, at 78-79 and nn.85-87.

116. *See* 16 U.S.C. § 3836a (2000). *See also* Taylor, *supra* note 57, at n.38.

117. *See* Taylor, *supra* note 57, at n.38.

118. *See* 16 U.S.C. § 3836a. *See also* Taylor, *supra* note 57, at n.36.

119. PROTECTING, *supra* note 17, at 2.

120. *Id.* at 3. Over $1.6 billion in requests for USDA conservation programs went unfunded this year. *Id.* at 6-18 (data reflects the 2001 fiscal year).

121. *Id.* at 3.

be denied federal assistance in the form of crop subsidies, disaster payments, or loans.[122] Ineligibility for subsidies is permanent unless the converted lands are restored.[123] While the deterrent effect is powerful, Swampbuster does nothing to restore wetlands converted to crop production prior to program implementation.[124] Swampbuster's most daunting problem is that a farmer can modify wetlands without penalty as long as the modification "does not make the production of an agricultural commodity possible,"[125] allowing conversion for an array of other development purposes at no penalty. Under a similar program, Sodbuster, farmers who put highly erodible lands into production without a conservation plan lose their eligibility for subsidies.[126] But a significant rise in crop prices may make it financially attractive to use targeted lands for production despite the loss in subsidies, and both programs become obsolete if price supports or other agricultural aid programs are discontinued.[127]

Although it is difficult to predict the vagaries of the federal budget and appropriations process, we appear to be at a crucial turning point in the funding of agricultural programs. Congress is currently working on the 2002 Farm Bill, and the House of Representatives has proposed over $170 billion for agricultural programs over the next ten years.[128] The House bill provides a little less than ten percent for conservation, potentially alleviating the backlog of program requests.[129] Yet it is not enough to include all the willing participants, and the bulk of the money still supports surplus commodities like corn and wheat, creating perverse disincentives for conservation.

Along with monetary subsidies, federal tax policy can provide incentives (or disincentives, as the case may be) for farmland preservation. Nancy McLaughlin's essay describes an income tax provision

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122. *See* Farrell, *supra* note 24, at 77.

123. *See* Karkkainen, *supra* note 61, at 67.

124. *See* Farrell, *supra* note 24, at 77.

125. *See* O'Brien, *supra* note 25, at 159 (citing 7 C.F.R. § 12.5(b)(1)(iv)).

126. Ruhl, *supra* note 20.

127. The 1996 Farm Bill was intended to do just that, by replacing "traditional price supports with flat 'market transition payments' which are not tied to commodity prices or production limits." *See* Karkkainen, *supra* note 61, at 67. However, the subsidy phase-out faded from the political agenda after the bottom fell out on commodity prices just two years into the transition. *See id. See also* Farrell, *supra* note 24, at 78; Taylor, *supra* note 58, at 182-83. *See generally* H.R. 2646,107th Congress (Oct. 2001) (the House 2002 Farm Bill continues extensive commodity price supports).

128. PROTECTING, *supra* note 17, at 3.

129. *See generally* H.R. 2646, 107th Cong. (Oct. 2001). The Senate bill would increase conservation spending and cap the total amount of annual subsidies at $275,000 per farm, forty percent less than currently allowed, to the advantage of small farmers. Jake Thompson, *Farm Subsidy Cap Gains Proponents*, OMAHA WORLD-HERALD, Feb. 21, 2002, at 1A.

that gives farmers a deduction for selling conservation easements to qualified charities.[130] As Professor McLaughlin recognizes, however, this will only provide encouragement for upper-income landowners,[131] excluding many small farmers who do not have a sufficient level of annual income to make the deduction valuable. Anyone who has spent any time in a small town coffee shop or feed store has heard the farmers' most common lament: "land rich, cash poor."

The value of the income tax deduction is further limited by the self-selecting nature of the incentive. Like the USDA's conservation incentive programs, farmers themselves choose whether they will participate, and this choice is typically a product of the farmer's business judgment and individual circumstances.[132] This is not to say that voluntary conservation easements, encouraged by federal taxation policy or otherwise, have no role in preserving biodiversity on private lands. They surely do. Federico Cheever explains that the advantage of a conservation easement for preserving open space and maintaining good habitat over, for example, a habitat conservation plan,[133] is that it can be maintained in perpetuity and it survives transfer to other owners.[134] Private arrangements can advance biodiversity goals so long as the protective measures are durable and cannot be avoided at the whim of subsequent property owners.[135]

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130. Nancy A. McLaughlin, *The Role of Land Trusts in Biodiversity Conservation on Private Lands*, 38 IDAHO L. REV. 453, 455 (2002).

131. *Id.* at 465, 468 (noting that the amount of land to be protected under section 170(h) is limited by the number of landowners with sufficient income to take advantage of the deduction).

132. *Id.* at 469. Of course, the farmer must find a charity willing to accept the easement, and in many cases qualified charities will only participate if the land has certain habitat values. See Conservation by Design, *at* http://nature.org/aboutus/howwework/about/art5719.html (The Nature Conservancy) (discussing the science based program used to prioritize lands). *See also* Cheever, *supra* note 50, at 447, 449 (noting that 38 percent of private land trusts surveyed in a 1998 census are "very involved" in preserving wildlife habitat).

133. Michael J. Bean, *Overcoming Unintended Consequences of Endangered Species Regulation*, 38 IDAHO. L. REV. 409 (2002) (describing HCPs as appropriate tools for maintaining good habitat on private lands).

134. *See* Cheever, *supra* note 50. If transferred to a charitable interest, the rule against perpetuity, which generally invalidates interests that extend for longer than the "lives in being" plus twenty-one years, does not apply. *See* 15 AM. JUR. 2D *Charities* § 19 (2000); 61 AM. JUR. 2D *Rule Against Perpetuities* § 6 (1981). However, the doctrine of "changed circumstances" may allow landowners to escape restrictions that no longer serve intended purposes due to fundamentally different circumstances. *See* RESTATEMENT OF PROPERTY (FIRST) § 564; *see also* RESTATEMENT OF PROPERTY (THIRD) § 7.11 (allowing modification and termination of servitudes due to changed conditions).

135. Cheever notes that purchasers can shake an encumbrance, such as a conservation easement, if they purchased without notice of that encumbrance. *See* Cheever, *supra* note 50, at 448. Requiring the conservation easement to be properly recorded can alleviate this concern.

Other provisions of the tax code may be more enticing than income tax deductions, at least for those farmers who are in fact "land rich, cash poor." Section 1257, for example, characterizes income from the sale of farmed wetlands as ordinary income, thereby denying farmers the benefit of capital gains treatment.[136] Conservation measures could also be encouraged by way of estate tax breaks, but as most small farms fall under the estate tax threshold, this would be of limited value.[137]

There are opportunities for completely different kinds of economic incentives as well. In some areas, water can be used as an appropriate financial incentive. For arid western lands, Marc Reisner suggests long-term contracts to provide cheap water from Bureau of Reclamation projects to farmers who agree not to develop their lands.[138] The longer the term, the cheaper the water, and the more guaranteed the delivery in times of shortage. Other options might include trading programs modeled on the 1990 Clean Air Act amendments, where farmers are given tradable credits for planting carbon-sequestering crops or adopting practices that reduce carbon dioxide, methane, or other pollutants.[139]

The upside of financial incentives is that, unlike regulation, farmers are apt to be less resistant to programs that embrace private property concepts and minimize the stigma of the big, bad federal government storming in and commanding some form of action. This difference in perception can play a key role in the success of conservation programs. Standing alone, however, incentive programs are not enough to ensure that farmland retains positive habitat values.

B. Maintaining Habitat Values

1. Regulating Working Farms

There are currently a variety of regulatory programs that could prove useful for maintaining good habitat on and around agricultural

136. *See* 26 U.S.C. § 1257 (2000).

137. The tax rate on large estates is fifty-five percent, but individuals can leave their heirs $675,000 tax-free, while married couples double that amount. *See* Jackie Calmes, *Republicans Discover Appeal of Killing 'Death Tax,'* WALL ST. J., Feb. 2, 2000, at B2. After a spate of proposed reforms, one of which was delivered to the White House on a John Deere tractor, Congress ultimately acted to phase out the estate tax by 2010, a measure which benefits only the wealthiest two percent of the population. *See* Susan Lee, *Death and Taxes*, WALL ST. J., June 1, 2001, at A14; William H. Gates, Sr., *Estate Tax Repeal Is an Inequity*, NEWSDAY, May 28, 2001, at A25.

138. *See* REISNER, WATER POLICY, *supra* note 19, at 17-19, 22-25 (articulating a proposal for water delivery incentives as a quid pro quo for preserving farmland).

139. *See* 42 U.S.C. §§ 7651-7651 (2000) (Clean Air Act sulfur dioxide trading program).

lands. There is no question that exemptions from federal permitting, reporting, and clean-up requirements for pollutants and wastes created by agricultural production contribute to environmental degradation and habitat destruction. Generally speaking, command and control regulation, requiring uniform technology-based limitations and permit systems and providing strong enforcement mechanisms, is an apt, and in many cases, the most qualified, tool for controlling pollution and countering its adverse effects.[140]

Federal regulatory options for protecting habitat on private lands include at least three primary avenues: the CWA; the Clean Air Act; and the ESA.[141] Controlling agricultural pollution through the CWA is perhaps the most obvious option. More agricultural activities could be brought into the CWA's permit program as point sources, subjecting them to stringent, uniform effluent limitations. Additional CWA initiatives could include establishing total maximum daily loads (TMDLs) to protect ambient water quality through enforceable controls on farm run-off, and regulating agricultural activities that affect wetlands through the CWA section 404 program.[142] In a similar vein, more stringent controls on small "area" sources of air pollutants could be imposed under the Clean Air Act.[143]

For some types of farm operations, particularly industrial-like operations with large-scale mono-culture crops or concentrated animal feeding operations (CAFOs), regulatory control through the CWA and Clean Air Act may well be the most appropriate answer.[144] Regulation

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140. *See* Zellmer, *supra* note 3, at 1234.

141. Closing loopholes for agricultural waste management and clean-up and regulating GMOs provide additional possibilities.

142. *See* Houck, *supra* note 29; John Davidson, *Conservation Agriculture: An Old New Idea*, 9 NAT. RESOURCES & ENV'T 20, 20 (1995). *See also supra* note 29 (describing section 404 requirements and exemptions). Some states have adopted more stringent restrictions on wetland development than imposed by federal law. Such measures are particularly valuable for preserving prairie potholes and other isolated wetlands in the wake of the Supreme Court's decision in *Solid Waste Agency of N. Cook County v. United States Army Corps of Eng'rs*, 531 U.S. 159 (2001). States have also protected wetlands and water quality by requiring farm waste management plans and best management practices. *See* 16 U.S.C. § 1455b (2000) (requiring coastal states with federally approved coastal management plans to adopt controls on nonpoint source pollution).

143. *See, e.g.*, Clean Air Act, 42 U.S.C. § 7412(a)(2),(i) (2000).

144. *See* Neil D. Hamilton, *Reaping What We Have Sown: Public Policy Consequences of Agricultural Industrialization and the Legal Implications of a Changing Production System*, 45 DRAKE L. REV. 289, 299- 300 (1997) ("As agriculture becomes industrialized, it should be treated like the 'industrial' sector, meaning the 'command and control' style of environmental laws applied to 'smoke stack' industries should apply."); Ruhl, *supra* note 33 (proposing that conventional regulatory approaches may best address agro-industrial "low hanging fruit," like CAFOs, but that taxes, trading programs, information

might also be necessary for addressing some types of pollution (persistent, bioaccumulative water and air pollutants, for example) and some types of sensitive media or exceptional habitat areas. Activities that impact wetlands should rank high on the regulatory "hit list."

Given the wide diversity in farms and farming operations, however, a comprehensive federal permitting regime that imposes uniform technology-based standards for agricultural emissions may not be especially workable or effective. Such a regulatory program would be extremely difficult to implement, particularly for small farms. If regulators cannot figure out how to craft suitable uniform standards and to implement them through enforceable permit requirements, regulation will yield only questionable environmental results. Perhaps worse yet, strict regulatory measures could have a significant backlash as the "straw that broke the camel's back," provoking farmers to sell out to developers. Although the "polluter pays" principle works well in most cases, for small farmers, expensive requirements mean not only going out of business but also losing their homes, in some cases, a home that's been in the family for generations.

As for the ESA, extending the prohibition on "take" to listed plants on private lands could provide relatively immediate biodiversity benefits.[145] However, the downsides of protecting plants through the ESA's "take" provision are formidable. If farmers were to discover a rare plant species on their land, the incentive to plow it over or pluck it and put it in a pot—inside, hidden from the probing eyes of government agents—may be irresistible. Farmers are well aware that plant species tend to propagate, and that the protected, "off limits" area would expand with every growing season, making it virtually impossible to use the land surrounding that plant for crops. Unlike wildlife species, plants are not migratory or even transitory, so the landowner would have no opportunity to utilize the land during any season of the year.[146] Further, because plants become legally protected property interests subject to ownership and dominion simply by virtue of their location,[147] the farmer could assert takings claims if the land could not be farmed and if the plant itself could not be utilized.[148] Last

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disclosure and other tools would be more effective in preventing water pollution from other types of farm operations).

145. See Coggins, *supra* note 21.

146. Even if the plant or its seeds lay dormant during winter, the destruction of its habitat would be restricted. *See* Babbit v. Sweet Home Chapter of Cmtys. for a Great Or., 515 U.S. 687 (1995).

147. *See* Holmes Rolston III, *Property Rights and Endangered Species*, 61 U. COLO. L. REV. 283, 293 (1990). In contrast, wild animals and birds must generally be "captured" to be subject to ownership. *See* Pierson v. Post, 3 Cai. R. 175 (N.Y. Sup. Ct. 1805); Missouri v. Holland, 252 U.S. 416 (1920).

148. *See* Lucas v. S.C. Coastal Council, 505 U.S. 1003 (1992).

but certainly not least, as a practical matter, the likelihood of ESA expansions being passed in Congress these days is nil. Other options may be more expedient and more effective.

2. Regulating Upstream Suppliers

Imposing federal requirements on chemical suppliers up the industrial chain from farmers could reduce pollution and protect quality habitat without placing burdensome regulations upon the private landowner. This would alleviate the shortcomings of existing federal pollution control law by controlling the distribution of pesticides and fertilizers.[149]

J.B. Ruhl suggests the creation of a national database of agrichemical releases modeled on the Toxic Release Inventory (TRI) program.[150] By requiring that releases of certain chemicals from manufacturing industries be reported, the TRI facilitates information transfer to regulators and the general public and pressures regulated entities to reduce overall pollution.[151] A "Farm Release Inventory" program would require reporting on releases, as well as the manufacture and sale of pesticides, herbicides, and fertilizers, creating a store of information that could help reduce the amount of pollution from farming. Proof that such a program is feasible exists in California where state reporting requirements provided the means for environmental groups to compile a comprehensive database of pesticide releases.[152]

The information could be used to prescribe limits on the amount of fertilizers and pesticides sold and ultimately applied to agricultural lands. Use limitations should be based upon a comprehensive diagnosis of the target property.[153] Diagnosis would take into account a number of factors, including the physical properties of the soils, the type of pests common to the area, the persistence and effects of agrichemicals on targeted and non-targeted species, the water quality of area waterbodies, the ability of natural buffers and substrate to reduce runoff into nearby surface and ground water sources, and the overall production benefit expected by the chemical application.[154] The

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149. *See* Ruhl *supra* note 33, at n.409 (observing a growing consensus that modern environmental law needs to focus on product life cycles).

150. *See id.* at 337-38 (citing 42 U.S.C. §§ 9603(a) and 11,023).

151. *See id.* at 312-13, 337.

152. *See id.* at 338.

153. *See generally* Maria Macy, *Agricultural Pesticide Runoff and Rural Well Owners* (2000) (manuscript on file with author) (describing benefits and methods of precision farming).

154. *See id.* at 6 (noting that the severity of nonpoint source runoff is "influenced by the slope or grade of an area; the erodibility, texture, and moisture content of the soil; and the amount and timing of rainfall and irrigation") (citing Ohio State Univ. Extension,

entire hydrological cycle must be considered in designing precision farming techniques to ensure that the applicator is not simply transferring pollutants from one environmental media to another.[155]

Chemical suppliers who sell quantities in excess of a prescribed amount could be required to provide information on the substances as well as the purchasers. In addition, incentives or penalties could be used to discourage farmers from purchasing excessive amounts, possibly with exceptions for those who can show that such quantities are consistent with an appropriate farm management plan. Informational requirements and precision farming programs could build on other existing environmental laws, such as the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), which requires the certification of persons who apply restricted pesticides.[156]

Restricting the distribution and use of pesticides and fertilizers is an important step in protecting the integrity of our nation's ecosystems, particularly aquatic habitat. In Florida, the application of fertilizers on agricultural lands surrounding Everglades National Park is controlled in terms of the amount used and the methods of application.[157] After a single year of program implementation, sugar crops flourished yet there was a forty percent drop in nutrient content from agricultural areas.[158] This success story causes one to question why similar federal restrictions are not extended to agricultural chemicals over a greater geographic area. Like ESA amendments, such measures face strong political opposition. The agricultural industry as a whole, including suppliers and wholesale purchasers of farm products, represents a formidable political force.[159] One thing is certain, however; agricultural pollution must be brought under control if biodiversity goals are to be met.

V. CONCLUSION

The Once-ler, having finally learned his lesson from the tree-hugging Lorax, instructed his young audience to nurture the very last

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Pesticides and Groundwater Contamination: Bulletin 820—Pesticide Properties, at http://www.agio-state.edu/~ohioline/b820.html) (last visited Feb. 18, 1999).

155. For example, wetlands or other physical features that trap runoff can result in the gradual leaching of pesticides to groundwater. *See* U.S. Entl. Prot. Agency, *Pesticides in Drinking-Water Wells*, 20T-1004, Sept. 1990 (almost fifty percent of Americans obtain their drinking water from groundwater wells, many of which obtain recharge from surface water resources).

156. *See* 7 U.S.C. §§ 136(e), 136a(d) (2000). Currently, certified applicators must keep records, but need only report if a specific request is made or state law requires disclosure. *See* 7 U.S.C. §§ 136i-1(a)-(c) (2000).

157. *See* FLA. STAT. ANN. § 373.4592(1)(d)-(e) (Harrison 1999).

158. *See* Houck, *supra* note 29, at 10,469.

159. *See* Ruhl, *supra* note 21.

trufella tree seed in existence: "treat it with care. Give it clean water. And feed it fresh air."[160] If the environmental message of characters like the Lorax and Farmer McElligot took root, maybe regulation or monetary incentives would not be necessary to protect biodiversity on private lands. But deep-rooted sentiments regarding the sanctity of property rights, along with the extensive web of commodity supports currently blanketing American agriculture, act as significant impediments to attaining biodiversity goals. No quick fix is possible, but an array of regulatory and incentive-based tools designed to preserve high quality farm habitat and restrict development activities in key areas might just hit the mark. It is a long row to hoe, but "unless someone like you cares a whole awful lot, nothing is going to get better. It's not."[161]

160. THE LORAX, *supra* note 4.
161. *Id.*